

HOME

AN ARGUS SPECIAL PUBLICATION

Feb 26-Mar 4, 1984

No. 101

45p

Computing

WEEKLY**Our first
C16/ Plus 4
program****Industry shows
off at LET****Prizes for
puzzlers in our
ENGLISH
SOFTWARE
competition****Take a PEEK
inside your
Amstrad
CPC 464****Make it
spritely:
graphics on
C64****Exclusive
Cuthberts
C16 Temple
review****MICRODEAL**

High street price wars

After you work out the potential of the Commodore Plus 4, its high street retailers have decided to sell it at a huge discount.

In branches of both John Lewis and Debenhams the C16 is now just £179.99, some selling for just £179.95. The official Commodore price for the pack is £179.99.

Commodore's official line is that it is a decision of "speculation". A spokesman says: "They are selling off inventory and want the cash in their hands. There's no word of profit in the package."

(Continued on page 10)

Non-starter wins race

Microsoft's Basic 80 Machine has been used in more of the home of the recent UK micro-computing rally than 12 other machines.

C64 set up to have been sold. There have been more sales of the Spectrum version, but this has been sold in comparison because it was not available in the UK. It is believed to be the most popular product.

Part of the difficulty is that the way software reaches the home of most local shops is a matter of distribution. Microsoft has a direct relationship with the local shops and can therefore offer a better service than the other manufacturers.

It is software houses who suffer when a computer manufacturer only has one local shop. Microsoft has a direct relationship with the local shops and can therefore offer a better service than the other manufacturers. It is software houses who suffer when a computer manufacturer only has one local shop. Microsoft has a direct relationship with the local shops and can therefore offer a better service than the other manufacturers.

(Continued on page 10)

FAST AND FURIOUS SLAP SHOT

ANIROG

SPEECH
No Hardware Required



ALL ACTION ICE HOCKEY

SLAPSHOT from Anirog is a two player, fast action, ice hockey program. Also in this thrilling game there is included a smoothly running speech synthesis system of the very highest quality. Before the actual game starts each player must select an international hockey team to represent. After doing this you must quickly and skillfully manoeuvre your man across the rink waiting for you to pass the puck to them. If you do manage to race past the opposing defence then you have a chance to shoot for goal and score. However, you still have the goalie to beat who is able to dive in all directions. Also included in this amazingly quick and totally original game is the ability to actually physically bodycheck your opponents. Never the less, do not be too aggressive otherwise you could incur a "two minute penalty", resulting in a timeout in your own end, giving the opposing side an easy chance of scoring. Also other extra features available include: Pause mode, and three levels of play ranging from fast to slow as well as a re-start option. **Slapshot** from Anirog is a totally original two player game with lightning fast action never seen before on the Commodore 64.

Two J.S. Commodore 64 Cassette £8.95 Disk £10.95



For Enquiries: Anirog Software Ltd. Unit 18, Victoria Road, Basing, Victoria Road, Camford, Kent, (0422)281212/3
Mail Order: 8 HIGH STREET, HORLEY, SUSSEX. IN YOUR CREDIT CARD. HORLEY CREDIT CARD

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Home Computing WEEKLY

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Non-starter wins race

From front page

"With this program, we wanted to show the industry that there is a great deal more to home computer technology than has been said before," commented Christian Perlefeld, a partner with Associates. "Basically we won the award because we kept our mouths shut. Too many people shout about software products, we waited for them to tell us how good it was."

The prize is based around the concept that you are winning as the creator of life with the aid of the computer. It is sold as a two cassette pack, one containing the program and the other a soundtrack reconstructed in the computer game. There are a number of stars on the soundtrack, Frankie Howard, Ian Dury and Joe Foweraker all giving distinctive contributions.

"We hope that the award will give the program a second lease of life, but we won the same award last year with *Parasite* and that still wasn't handled by the large distributors," commented Mr Perlefeld.



Program of the Year 1983

There were a number of other awards presented at the ceremony including Programmer of the Year (Gordon) which went to Einar's Ian Bell and David Bingham, Program of the Year (utility) presented to Water Lightworks, Programmer of the Year (utility) awarded to Locomotive for Amstrad BASIC, Program of the Year (international) won by ASK for Fold.

The hardware prize was given to Amstrad for the CPC464 computer, voted

Product of the Year (domestic) and to Rotronics for Whodunnit as Product of the Year (international).

Associates, 27 Markham Rd, Portsmouth, Hants PO4 9DA

High Street Price Wars

From front page

A spokesman for Specs announced this new "Saver" summary machines are less popular now due to the fall in price of the larger summary models. "We were an over-looked after Christmas, but believe that our prices must be competitive."

Dons is also extending it's Price Pledge to this area, in a one day drop from Specs and had you could have bought cheaper before now they in the same area, Dons will refund the price difference.

WH Smith has also dropped the price, but only to £119.95.

The fall in price seems to be due to the recent price fixing of both Acorn and Sinclair computers which has driven the high street into disarray.

The changes seem to signify for some of the sales that they were refusing to hand written price cards for their computer lines, because there was nothing to print up the new rates.

Jack Trueman, boss of Acorn, has also ended the price cutting blood.

He has announced the Acorn Super Pack, comprising the Acorn BASIC, A50, a 1010 program recorder and cassette versions of Plot, Printout, Revision to Programming 1 and a graphics demo.

This means you will be able to choose from three machines all at £239.95 the Spectrum, Atom and the Electron with A50, A40 and A20 respectively. It will be interesting to see who wins and who loses in this battle of the prices.

Acorn, Ashgate Way, Sharnbrook, Beds MK12 1BT



Atari £129.95 computer pack



Jimmy Savile receives the Hi Hi for Nicola Monteville

In a good cause

Sony UK has donated a Hi Hi M800 computer for the use of patients in Stoke Mandeville Hospital. The presentation was made to Jimmy Savile, well-known for his association with the hospital.

The computer is particularly useful for disabled or handicapped patients, according to Sony.

The machine will be used in the new craft centre at the Stoke Mandeville Unit, where patients learn new skills.

Sony also presented software and peripherals with the new M800.

Amstrad sorcery

Vega Games has just released a new version of the game Sorcery. Originally for the Spectrum, it's now available on the Amstrad CPC464.

The game comes complete with Vega's new fast loader Packload, and is priced at £9.95.

Vega Games, 2-4 Henson Rd, Parkside Rd, London W17 3YF

Available on both cassette and disc, the game costs £9.95 and £12.95 respectively.

UX Craft, Unit A2, Redway Ind Centre, Barnage St, Barnsley, S40 4LP

Bigger and better

Bigger than A8000, for the C64, it is to be rebranded in a slightly modified version.

Originally released in autumn 1984, A8000 is confident that this first round it will be successfully meet previous A8000 describes the game as "exciting, and extremely difficult to master".

The new version includes a reduced shell language level and a joystick facility, both alternatives to the original. There is also a first prize. The game costs £7.95.

A8000, 4 Orange St, Sheffield S2 4DP

Slave trade

A & P Software has moved into the home market with the introduction of a new MSX EPROM for the BBC called The Slave.

According to A & P, the product encompasses all the good points of those EPROMs which are already available, plus more responsibilities to the programmer. It comes with a 64-page manual called 'The Slave Owners' Guide'.

The Slave will cost £49.95 and will be available shortly by mail order only.

A & P, Unit 6, Canbake Ind Est, Woodhouse St East, Rotherham, S60 4LS

FAST bill makes progress

Legislators spent today's time on the second reading of the Copyright (Computer Software) Amendment Bill in the House of Commons on Friday, February 22.

The bill was proposed by William Powell, Conservative member for Cork, in behalf of FAST, the Federation Against Software Theft.

If the bill becomes law, software pirates face possible imprisonment of up to two years and unlimited fines. William Powell quoted the amount of revenue lost to software houses as £100m in 1984.

The new law would provide protection for both business and leisure software. Donald McLeen, FAST chairman, stressed that those who get prosecution under the new law is passed will be the thieves who copy and then sell software.

And FAST directors are anticipating an unexpected passage of the bill. One has been debated at the second hearing, it is discussed by a special committee, and goes before the Commons one more time, before being referred on to the House of Lords and then finally comes before the Queen.

FAST was set up in July and William Powell's brother was established in November. He is proposing the Copyright (Computer Software) Amendment Act in a private member's bill. Mr Powell explained that approximately 300 members' names got into a list at the beginning of a session, and are not pulled out, with the passage of a second hearing. His name was the first.

The new copyright act will establish the protection of all software, whether or not it is created before the bill becomes law. The issue in question is whether intellectual property can be copyrighted.

William Powell continued: "The problem of software piracy has reached epidemic proportions worldwide, and FAST is not alone. Similar organizations have been set up in Canada, Australia, and the United States."

"The Copyright (Computer Software) Amendment Act means that all doubts in lawyers' minds will be eased. The police will be given the power to search, and since the video copyright act came into being, it is believed that the two-thirds of the piracy in that



Keith Halliwell, inventor of Soft Lead

industry has been eradicated." He went on: "This bill is therefore an extremely important proposed change. A possible £100m can be saved with the enforcement of the new law."

Roger Barker, FAST director, said: "Computer games have a shelf life of about three months. Within a week of a game being released, a revised version is taken. We know of 10 or 12 companies in existence. These are people who were operating in places of sound recording, and who have found this copying software is more lucrative and safer."

He continued: "We estimate that 50 per cent of games are reworked. Clear the trading standards officer is able to enforce the law, the problem of software theft should be eradicated."

"Software creators have to carry some form of identification, like a biologists or a nuclear expert. There can be some notion of recognizing software creation."

■ **Soft Lead**, the software anti-piracy system, was demonstrated recently at the House of Parliament.

Magpie Electronics, who developed the system, showed how a physical change to the design of a computer cassette would make it impossible for anyone to make a working back-up copy.

Manyware software houses expressed an interest in the system which could put an end to software theft, a serious problem of which vary from £10m to £100m.

Home Computing Weekly has agreed, with the cooperation of a couple of software houses, to monitor the system and anticipate the claims made about it.

FAST, Chancery House, Chancery Ln, London WC2A 1QU. Alpha, PO Box 1, Aspley, Essex SS6 4LH.

Robots for all

Integratron Robots launched the new Zero 2 which is the first real robot under £100.

Integratron, for the C&A, Spectrum and BBC, are already available and also a personal computer for machines with a Robot controller.

All the answers the computer is by an



The Zero 2, 'the first true robot under £100'

Present = prize

Mr. Fletcher bought two Amstrad 486s and was an £800 computer in the monthly prize draw. The prize was a Commodore 500 64 portable computer. Now Mr. Fletcher can have the old Commodore machine and £100 and the £800 and the £100.

There will be prize draws every month and Mr. Fletcher will be the same prize.

Amstrad, Amstrad Ltd, Palace St, London SW1.

switched on, but there are plans for an ultra-red connection in the near future.

The software available is all standard or microcomputer based, but other useful programs are at the pipeline.

The robot differs from others in that a number of add-ons are possible. Speech is a real prospect. Robots Engineer, marketing director, suggests that the day when the robot gives you a hand at the door is not far distant.

Controlling the robot is simple and it is possible using just a few lines of BASIC. There are a number of LOGO programs available from other suppliers, including Bartlett's Spectrum LOGO, Logosoft's BBC LOGO and a version for the C&A. Mr. Steve Barker described the Zero 2 as a "very innovative product" and added that "it should do much to introduce robotics into homes and schools."

It includes a drawing system with pen up and down commands. L&Ls can be controlled on and off, a two-foot horn and a two foot horn. Future ideas include a bump detector and a hole sensor. The aim of the hole sensor is to prevent the robot falling off a table.

Dorchester, Amstrad, Unit 758, Parkway, Dorchester, Dorset DT1 1JL.

Soft Aid Finalised

Soft Aid, the software industry's response to the Thatcher appeal, has now released details of the rules on the tape.

The Commodore 64 tape will contain Camtech (A&T), Palfit (Amstrad), Star Trek (Mag. Publ.), Robinson Wall (Star), Cross River (Inter-



Ian and Stephen collect their prize

In this week's competition we are offering 100 prizes from English Software. If you own a C64, Atari, BBC, Electron or Amstrad CPC464 then there could be a prize in store for you.

Depending on which computer you own, you will receive one of the following prizes: Colossus Chess 3.0 for all 486, Atari computers (10.95), one volume of Atari Smash Hits, which is a 328, Atari games (10.95), Henry's House for the C64 (10.95), Ben Boon Jack for the 1080, Spectrum and C64 (10.95) and for the Amstrad (10.95), Wackawack for the C64 (10.95) and Legend of the Knecker-Hole for the C64 (10.95).

Colossus Chess 3.0 is English Software's latest title and was written by Martin Brown, a computer chess programmer with seven years' experience. According to English Software, the program has a perfect understanding of all the relevant chess, including endgame positions, the fifty move rule and all drawn by repetition. It also handles all the standard moves, including King and two Bishops against King, and the very difficult King Bishop and Knight versus King.

There are three volumes of Atari Smash Hits, each containing five games including some of English Software's most

Jamboree of prizes from English Software

There's something for nearly everyone this week in English Software's competition. All you have to do is unscramble the anagrams

ENGLISH SOFTWARE
ENGLISH SOFTWARE
ENGLISH SOFTWARE
ENGLISH SOFTWARE
ENGLISH SOFTWARE

succesful titles, for instance Ben Boon Jack, Ben Boon Jack and Diamonds.

Henry's House is a platform game in which you must guide Little Henry around the maze

labyrinth to leave the secrets of each room. Ben Boon Jack is also a platform game in which Jack, the great cat jumper, gets his way through a record breaking game. Legend of the Knecker-Hole also features Jack. This time he must fight a dragon in order to marry a princess. Wackawack is an arcade game featuring landscapes, and loads with puzzles and mazes.

If you think you'd like to win

one of these prizes then you can join the jamboree. You've got just ten days to find out more about it.

Anagram

read ten
change
a piece of
can make
see a new
wrap her

Here is an

easy one to start. They are anagrams of words, names and concepts, and English Software. Unscramble the anagrams to find the words.

Write your answers on the coupon in the space provided. Fill in the names clearly, writing your full name and address. From English — if you own a system the coupon will be used as a label for your prize. Important: even write your answers on the back of your postal envelope.

Send your entry to English Software, 4, Corporation, House of Commons, 10, Whiteley Way, 1, Whiteley, South, London W19 1JH. Close any date in the post on Friday 22 March 1985.

You may enter as many times as you wish, but each entry must be a different coupon — not a copy — and sealed in a separate envelope.

Prizes will be sent from English Software within 24 hours of the publication of the results of the competition.

The rules

Prizes will not be awarded from companies and agencies. English Software, 4, Corporation, 10, Whiteley Way, 1, Whiteley, South, London W19 1JH. This competition also applies to companies, clubs and groups of the company.

The rules in these words form part of the rules.

English Software Competition

Entry Coupon

Name _____

Address _____

post code _____

Computer owned C64, Atari, BBC, Electron, Amstrad

CPC464 — Ring one

Answers

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____

Prizes will not be awarded from companies and agencies. English Software, 4, Corporation, 10, Whiteley Way, 1, Whiteley, South, London W19 1JH. This competition also applies to companies, clubs and groups of the company.



TOP 20 Gallup Software

Compiled by

HCW is proud to present the Gallup software chart — the one to believe in. Gallup's reputation as a credible market research company is second to none. This software study is carried out nationwide in both independent and chain stores, on a weekly basis. This is a chart to watch out for — the one you know you can trust.

LAST WEEK		THIS WEEK		TITLE	PUBLISHER	WEEKS ON CHART		WEEKS ON CHART		WEEKS ON CHART		WEEKS ON CHART		WEEKS ON CHART	
NO.	RANK	NO.	RANK			1	2	3	4	5	6	7	8	9	10
1	1	1	1	Ghostbusters	Activision	*	*								
2	2	2	2	Zaxxon	US Gold	*	*	*						*	*
3	3	3	3	Daley Thompson's Decathlon	Gosnell	*	*	*							
4	4	4	4	Bearly	Pinksoft	*	*	*							
5	5	5	5	Football Manager	Addictive	*	*	*	*						*
6	6	6	6	Alswolf	Elite	*	*								
7	7	7	7	Jet Set Willy	Software Projects	*	*	*						*	*
8	8	8	8	Monty Miner	Software Projects	*	*	*	*					*	*
9	9	9	9	Technician Ted	Newton Consultants	*	*							*	
10	10	10	10	Hunchback II	Gosnell	*	*								
11	11	11	11	Hunchback	Gosnell	*	*	*	*	*					
12	12	12	12	Blue Man	US Gold	*	*	*	*	*				*	
13	13	13	13	Flight Path 737	Amiga	*	*	*	*	*				*	*
14	14	14	14	Blackboarders	Moscon	*	*	*	*	*					
15	15	15	15	March Day	Gosnell	*	*								
16	16	16	16	Brain Bloodies	The Edge	*	*						*		
17	17	17	17	Chiller	Mastromiro	*	*	*							
18	18	18	18	Monty is Innocent	Samlin Graphics	*	*								
19	19	19	19	Pyjamarama	Mikro Gen	*	*					*			
20	20	20	20	Edin	Acornsoft	*	*	*	*						

SPECTRUM

Top Ten

- 1 Ghostbusters
Activision
- 2 Zaxxon
US Gold
- 3 Alswolf
Elite
- 4 Bearly
Pinksoft
- 5 Daley Thompson Decathlon
Gosnell
- 6 March Day
Gosnell
- 7 Technician Ted
Newton Consultants
- 8 Brain Bloodies
The Edge
- 9 Monty is Innocent
Samlin Graphics
- 10 Jet Set Willy
Software Projects

BBC

Top Ten

- 1 Edin
Acornsoft
- 2 Football Manager
Addictive Games
- 3 Sabre Wolf
Ultimate
- 4 Eddie Kidd Jump Challenge
Merch
- 5 Jetpac
Ultimate
- 6 Hunchback
Gosnell
- 7 Chiller
Acornsoft
- 8 Return to Eden
Level 9
- 9 Blackboarders
Moscon
- 10 Monty Miner
Software Projects

COMMODORE

Top Ten

- 1 Ghostbusters
Activision
- 2 Road Over Moscow
US Gold
- 3 Fowl
Sunsoft
- 4 Bruce Lee
US Gold
- 5 Daley Thompson Decathlon
Gosnell
- 6 1985 the Day After
Mastromiro
- 7 Football Manager
Addictive Games
- 8 Zaxxon
US Gold
- 9 Bearly
Pinksoft
- 10 Beach Head
US Gold

LET 1985

The LET show ran from February 17-19 at Olympia, London. It's a show which is organised by LET magazine for the computer and software retailing trade, and a number of companies took this opportunity to showcase new products. In this feature we bring you the highlights.

David Crane, author of Activision's *Ultimate* series, made a personal appearance on Sunday afternoon introducing 15 new games. IRL, managing director of Crefit House described Activision's spring range as 'an extension as it is diverse'. He went on: 'Both our new company design and our new software have reflected overall strategy for 1985 — to broaden our base in the UK and encompass the widest possible market'.

A & P has produced a database generator Alpha-Gee to supplement Alpha-Bot. With Alpha-Gee you can make up your own questions, and if you can create your own database, A & P is offering £1000 if you receive it suitable for public

The LET exhibition is usually supported by a good turnout — of both exhibitors and attendants. Here's a rundown of the main points

tion. You can buy Alpha-Frog and Alpha-Gee separately in £175, or as a two-pack at £340.

Also from A & P: *Opheant* and *Ultimate Dodge* for the BBC (£6.95), while *Dodge* owners haven't been forgotten. *Supersing*, *Abdaba*, also in £5.95, is as broad a game for the Spectrum.

A & P was also showing the following in chess-topping *Chess-Lap Egg*. Periodically called *Checker Egg 2*, it involves the art of not allowing your move from screen to screen. There will be over 100 different variants and after you have carved a grid to this one,

and a break in time, you will probably be quizzed. *Vortex* is the above basic strip with a real support in the form of a chocolate egg containing a toy.

Look out for more about this game in future BCW's especially around Easter time.

Apex Prime Software was showing the Spectrum version of *Adem*, as well as *Cave* and *Baggins* to *Island* SE, for C64 and Atari. Based on Paul McCann's film of the same name, the game requires careful thought and strategic planning.

Artis announced a new joystick for the Commodore 16, costing £4.95. Adjusting the dial is a new range of budget priced

software, in £1.99.

Batfile Fan was presenting a new range of titles. There's *Shardale* for the MSX, *Apes* (also for the Commodore 64 and *Wizard's Lair* for the Spectrum).

Big Bite was presenting many new games in the area three months, including *Apocalypse* for the C64 and *Step Cool* for the Spectrum.

Parky and the *Yellow Submarine* was the title introduced. *Chess-Lap* is a planned series of games featuring the Chess-Lap *Chess-Lap*, he wanted for his last location on the sea bed. There are 90 screens which must be completed, one mission in each and various objects to collect. Price: £4.95.

Chemish Marketing, sister company to *Chess-Lap*, was launching its *memory/data recorder*. At £29.95 a low integral DPM looked and could make life easier with the aid of one master adaptation instead of pressing both Play and Record you only need to

Spectrum new joystick



degrees and Exotic key.

Teleman on the Spectrum was one of Games Workshop's new releases. This fantasy boardgame is either for one or up to four players. Also from Games Workshop: D-Day for both QL and Commodore 64.

D-Day has been upgraded for the QL and includes over 3000 of programming and 28 of computer realignment. QL version costs £24.95, while C64 costs £9.95.

Gordale was previously Superdrama, in Don Trouble and Ragson Watt, while Inconceivable was exhibiting Moon Cross, screened in HCW 180. Players were competing to win the original Moon Cross machine.

Interceptor Mirra was showing a large range of games. For the Commodore 64 there were Flight Lane, Beach Fever, Daytime Bizarre, Caverns of Eblis, Empire of Karn, Exotic and Crystal of Carn. Helaga and Heroes of Karn are for the Spectrum, Heroes of Karn and Chappa Sound run on the Amstrad CPC464, while Vulkan is for the VIC-20.

Kingship revealed a new line of jetsuits and interfaces. Top of the range is the Formula 1, based on the Pro 5000 series. It is self-centering and has dual fire buttons. Second in the range is the Formula 2, with pistol grip, top and base buttons.

The three new interfaces are the Kompton Jetpack Computer, Pro Jetpack Computer, Pro and Compton II.

Liamson was exhibiting Psychobella, while Melkorian Moon's Moller has now been standard for the MSX and Amstrad. A line-up of arcade games and tables was being provided, with the emphasis on the C64.

Mirra-Gee's Everybody's a Wally made it's debut at the show. This multi-role arcade adventure has you in charge of five other characters. It's happy family time, with lots of Wally's friends and relatives helping him in his quest. Everybody's a Wally is available on the Spectrum, and C64 and Amstrad CPC464 systems are planned. Price £8.95.

Mirra-Gee revealed it's conversions of Mr Men to Amstrad, MSX and Atari. Also now are a range of educational and arcade games for youngsters.

Green was showing it's range of chart hits. Daisy Thompson's Decadence, 246 from the Gods, Hunchback II, King Striker Back and March Day have all these.

Optimes exposed it's first

title for the Spectrum: Underworld — The Villain. It's a text adventure written using the Quill, with 120 locations. Price £4.95.

Also from Optimes — Moonbase, a database for C64 and Orac/Amstrad. Available on cassette or disc, the program comes together with a comprehensive manual, and costs

£24.95 for the Commodore and £17.95 for the Orac.

Protek was exhibiting it's own range of jetsuits, as well as a language course for the Amstrad CPC464. Interiors was reduced in price to £19.95.

Software Communications has three jetsuits promoting its Superstar Challenge plans, with another pack of screens

on the stand was the Living Body, which is totally available for the C64, with BBC version to follow.

Tinked had an Amstrad conversion of James' and a preview of Super Puddle II, while Typex was showing off Flyer Fox, Gandall the Soccer, Type-Singer, Type-Singer and The Officer. For the most part, these are one player 3D simulations.

Finally, Vulkan launched it's range of add-ons. Top of the range is the Gamma jetsuit, while the Master is compatible with the BBC. Three interfaces will connect these jetsuits to your computer, and the price ranges from £8.95 to £19.95. With these interfaces the Gamma can be used with Spectrum, BBC and Electron.

Liamson's Psychobella



Green's Match Day

Addresses

Activision, 15 Marry House, Marylebone Rd, London.

A. B. F. Unit 1, Cambridge Ind Est, Woodhouse St, Wms, North-

ampton, Essex CM4 4LB.

Amiga Press Software, Library House, 222 Regent St, London W1B 4AL.

Amiga Press Software, 222 Regent St, London W1B 4AL.

Amiga Press Software, 222 Regent St, London W1B 4AL.

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Amiga Press Software, 222 Regent St, London W1B 4AL.

Amiga Press Software, 222 Regent St, London W1B 4AL.

10-110 there is twelve
 110 your data
 120 and your data
 130-140 computer system
 150-160 with system
 170-180 calculation of
 190-200 in order to
 210-220 more information
 230-240 at all times and
 250-260 some place
 270-280 other large
 290-300 (possibly
 310-320 finished) some
 330-340 data information
 350-360 is a combination of both
 370-380 and in the
 390-400 system display

When the two video displays
 in a small room it was that they
 gave simple or intermediate
 data in large, bold, and black, the
 data were the same as the
 information in the large room. It
 appeared to have been made by
 the same or the same man of
 the same, and the it was

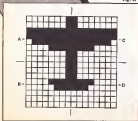
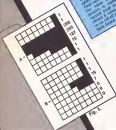

```

5000 PRINT "P = POKE53055,B+POKE53051,B+POKEV+25,5:TB=TB+POKE54255,B
5005 REM REM= 54C00
5010 L=" "
5015 PORT=17015
5020 PORG=17055+PRINTLEFTS(UB,AD)+POKE546,AD-15/12315:PRINT"
5030 REM
5035 NEXT
5040 PORG=2470:STEP=1+PRINTLEFTS(UB,AD)
5045 REM
5050 REM CLR=INT
5055 PRINT " " IF PORG=3000,5 IF PORG=3001,5
5060 REM 54C00= 54C00
5065 PRINT " " 54C00 POSITION51-7
5070 T=VAL(RIGHT(TB,2))
5075 IF T>TH+1 THEN PL=1
5080 IF T>TH+2 THEN T=TH+1 THEN PL=2
5090 IF T>TH+3 THEN T=TH+2 THEN PL=3
5100 REM 54C00
5110 IF PL=1 THEN PRINT " 1. FRANK BLANKER (PAB) = 41*RIGHTS+TH+2)+50705100
5120 REM 54C00
5125 PRINT " 1. "NM" (PAB) = 41*RIGHTS+TH,2)
5130 REM C00
5135 IF PL=2 THEN PRINT " 2. STEVE FORDWICK (CAB) = 41*RIGHTS+(STE+TH+2),2)+50705100
5140 REM C00
5145 IF PL=3 THEN PRINT " 3. "NM" (CAB) = 41*RIGHTS+TH,2)+50705100
5150 REM C00
5155 PRINT " 2. FRANK BLANKER (CAB) = 41*RIGHTS+TH,2)
5160 REM C00
5165 IF PL=4 THEN PRINT " 3. SURGE (CAB) (CAB) = 41*RIGHTS+(STE+TH+2),2)+50705100
5170 REM C00
5175 IF PL=5 THEN PRINT " 3. "NM" (CAB) = 41*RIGHTS+TH,2)
5180 REM C00
5185 PRINT " 3. STEVE FORDWICK (CAB) = 41*RIGHTS+(STE+TH+2),2)
5190 REM 44C00
5200 PRINT " " PRESS A KEY TO PLAY AGAIN"
5210 GET#="PAB=" THEN 5010
5215 FOR#="TOV=" POKEV,B:PRINT
5220 REM
7000 DATA 43,21,127,43,79,35,27,32,27,32,27,123,145,54,43,79,32,27,54,54
7010 DATA 7,43,21,27,123,145,123,32,52,27,27,55,32,123,32,25,21,32,123,54
7020 DATA 73,32,55,32,25,55,123,55,132,123,145,173,134,27,32,55,32,79,32,55
7030 DATA 7,123,32,123,55,32,43,32,27,123,123,125,127,152,123,123,54,123,54,55
7040 DATA 32,55,54,124,123,123,127,124,123,124,122,55,43,32,32,54,54,123,124,143
7050 REM RVS OFF
8000 REM C0=" " REM RETURN
8005 REM RVS OFF
8010 REM C0=" " REM RETURN
8015 REM RVS OFF
8020 REM C0=" " REM RETURN
8025 REM RVS OFF
8030 REM C0=" " REM RETURN
8035 REM RVS OFF
8040 REM C0=" " REM RETURN
8045 REM RVS OFF
8050 REM C0=" " REM RETURN
8055 REM RVS OFF
8060 REM C0=" " REM RETURN
8065 REM RVS OFF
8070 REM C0=" " REM RETURN

```



The image shows a blue, rectangular object, likely a piece of paper or a small book cover, tilted diagonally. The object features a grid of small, dark, rectangular markings, possibly a barcode or a series of small labels. The background is a light, textured surface.



```

1000 FOR I=0 TO 359 STEP 90
1010 PRINT "PRINT 0. ROTATION THROUGH 90 DEGREES  
CLOCKWISE."
1020 PRINT "PRINT 1. REFLECTION IN THE HORIZONTAL  
PLANE."
1030 PRINT "PRINT 2. ROTATION THROUGH 90 DEGREES  
CLOCKWISE."
1040 PRINT "PRINT 3. REFLECTION IN THE HORIZONTAL  
PLANE."
1050 PRINT "PRINT 4. ROTATION THROUGH 90 DEGREES  
CLOCKWISE."
1060 IF I=0 THEN GOTO 1070
1070 IF I=90 THEN GOTO 1080
1080 IF I=180 THEN GOTO 1090
1090 IF I=270 THEN GOTO 1100
1100 IF I=360 THEN GOTO 1110
1110 IF I=0 THEN GOTO 1070
1120 FOR J=0 TO 359 STEP 90
1130 PRINT "PRINT 0. ROTATION THROUGH 90 DEGREES  
CLOCKWISE."
1140 PRINT "PRINT 1. REFLECTION IN THE HORIZONTAL  
PLANE."
1150 PRINT "PRINT 2. ROTATION THROUGH 90 DEGREES  
CLOCKWISE."
1160 PRINT "PRINT 3. REFLECTION IN THE HORIZONTAL  
PLANE."
1170 PRINT "PRINT 4. ROTATION THROUGH 90 DEGREES  
CLOCKWISE."
1180 IF I=0 THEN GOTO 1190
1190 IF I=90 THEN GOTO 1200
1200 IF I=180 THEN GOTO 1210
1210 IF I=270 THEN GOTO 1220
1220 IF I=360 THEN GOTO 1230
1230 IF I=0 THEN GOTO 1190
1240 IF I=90 THEN GOTO 1250
1250 IF I=180 THEN GOTO 1260
1260 IF I=270 THEN GOTO 1270
1270 IF I=360 THEN GOTO 1280
1280 IF I=0 THEN GOTO 1190
1290 IF I=90 THEN GOTO 1300
1300 IF I=180 THEN GOTO 1310
1310 IF I=270 THEN GOTO 1320
1320 IF I=360 THEN GOTO 1330
1330 IF I=0 THEN GOTO 1190
1340 IF I=90 THEN GOTO 1350
1350 IF I=180 THEN GOTO 1360
1360 IF I=270 THEN GOTO 1370
1370 IF I=360 THEN GOTO 1380
1380 IF I=0 THEN GOTO 1190
1390 IF I=90 THEN GOTO 1400
1400 IF I=180 THEN GOTO 1410
1410 IF I=270 THEN GOTO 1420
1420 IF I=360 THEN GOTO 1430
1430 IF I=0 THEN GOTO 1190
1440 IF I=90 THEN GOTO 1450
1450 IF I=180 THEN GOTO 1460
1460 IF I=270 THEN GOTO 1470
1470 IF I=360 THEN GOTO 1480
1480 IF I=0 THEN GOTO 1190
1490 IF I=90 THEN GOTO 1500
1500 IF I=180 THEN GOTO 1510
1510 IF I=270 THEN GOTO 1520
1520 IF I=360 THEN GOTO 1530
1530 IF I=0 THEN GOTO 1190
1540 IF I=90 THEN GOTO 1550
1550 IF I=180 THEN GOTO 1560
1560 IF I=270 THEN GOTO 1570
1570 IF I=360 THEN GOTO 1580
1580 IF I=0 THEN GOTO 1190
1590 IF I=90 THEN GOTO 1600
1600 IF I=180 THEN GOTO 1610
1610 IF I=270 THEN GOTO 1620
1620 IF I=360 THEN GOTO 1630
1630 IF I=0 THEN GOTO 1190
1640 IF I=90 THEN GOTO 1650
1650 IF I=180 THEN GOTO 1660
1660 IF I=270 THEN GOTO 1670
1670 IF I=360 THEN GOTO 1680
1680 IF I=0 THEN GOTO 1190
1690 IF I=90 THEN GOTO 1700
1700 IF I=180 THEN GOTO 1710
1710 IF I=270 THEN GOTO 1720
1720 IF I=360 THEN GOTO 1730
1730 IF I=0 THEN GOTO 1190
1740 IF I=90 THEN GOTO 1750
1750 IF I=180 THEN GOTO 1760
1760 IF I=270 THEN GOTO 1770
1770 IF I=360 THEN GOTO 1780
1780 IF I=0 THEN GOTO 1190
1790 IF I=90 THEN GOTO 1800
1800 IF I=180 THEN GOTO 1810
1810 IF I=270 THEN GOTO 1820
1820 IF I=360 THEN GOTO 1830
1830 IF I=0 THEN GOTO 1190
1840 IF I=90 THEN GOTO 1850
1850 IF I=180 THEN GOTO 1860
1860 IF I=270 THEN GOTO 1870
1870 IF I=360 THEN GOTO 1880
1880 IF I=0 THEN GOTO 1190
1890 IF I=90 THEN GOTO 1900
1900 IF I=180 THEN GOTO 1910
1910 IF I=270 THEN GOTO 1920
1920 IF I=360 THEN GOTO 1930
1930 IF I=0 THEN GOTO 1190
1940 IF I=90 THEN GOTO 1950
1950 IF I=180 THEN GOTO 1960
1960 IF I=270 THEN GOTO 1970
1970 IF I=360 THEN GOTO 1980
1980 IF I=0 THEN GOTO 1190
1990 IF I=90 THEN GOTO 2000
2000 IF I=180 THEN GOTO 2010
2010 IF I=270 THEN GOTO 2020
2020 IF I=360 THEN GOTO 2030
2030 IF I=0 THEN GOTO 1190
2040 IF I=90 THEN GOTO 2050
2050 IF I=180 THEN GOTO 2060
2060 IF I=270 THEN GOTO 2070
2070 IF I=360 THEN GOTO 2080
2080 IF I=0 THEN GOTO 1190
2090 IF I=90 THEN GOTO 2100
2100 IF I=180 THEN GOTO 2110
2110 IF I=270 THEN GOTO 2120
2120 IF I=360 THEN GOTO 2130
2130 IF I=0 THEN GOTO 1190
2140 IF I=90 THEN GOTO 2150
2150 IF I=180 THEN GOTO 2160
2160 IF I=270 THEN GOTO 2170
2170 IF I=360 THEN GOTO 2180
2180 IF I=0 THEN GOTO 1190
2190 IF I=90 THEN GOTO 2200
2200 IF I=180 THEN GOTO 2210
2210 IF I=270 THEN GOTO 2220
2220 IF I=360 THEN GOTO 2230
2230 IF I=0 THEN GOTO 1190
2240 IF I=90 THEN GOTO 2250
2250 IF I=180 THEN GOTO 2260
2260 IF I=270 THEN GOTO 2270
2270 IF I=360 THEN GOTO 2280
2280 IF I=0 THEN GOTO 1190
2290 IF I=90 THEN GOTO 2300
2300 IF I=180 THEN GOTO 2310
2310 IF I=270 THEN GOTO 2320
2320 IF I=360 THEN GOTO 2330
2330 IF I=0 THEN GOTO 1190
2340 IF I=90 THEN GOTO 2350
2350 IF I=180 THEN GOTO 2360
2360 IF I=270 THEN GOTO 2370
2370 IF I=360 THEN GOTO 2380
2380 IF I=0 THEN GOTO 1190
2390 IF I=90 THEN GOTO 2400
2400 IF I=180 THEN GOTO 2410
2410 IF I=270 THEN GOTO 2420
2420 IF I=360 THEN GOTO 2430
2430 IF I=0 THEN GOTO 1190
2440 IF I=90 THEN GOTO 2450
2450 IF I=180 THEN GOTO 2460
2460 IF I=270 THEN GOTO 2470
2470 IF I=360 THEN GOTO 2480
2480 IF I=0 THEN GOTO 1190
2490 IF I=90 THEN GOTO 2500
2500 IF I=180 THEN GOTO 2510
2510 IF I=270 THEN GOTO 2520
2520 IF I=360 THEN GOTO 2530
2530 IF I=0 THEN GOTO 1190
2540 IF I=90 THEN GOTO 2550
2550 IF I=180 THEN GOTO 2560
2560 IF I=270 THEN GOTO 2570
2570 IF I=360 THEN GOTO 2580
2580 IF I=0 THEN GOTO 1190
2590 IF I=90 THEN GOTO 2600
2600 IF I=180 THEN GOTO 2610
2610 IF I=270 THEN GOTO 2620
2620 IF I=360 THEN GOTO 2630
2630 IF I=0 THEN GOTO 1190
2640 IF I=90 THEN GOTO 2650
2650 IF I=180 THEN GOTO 2660
2660 IF I=270 THEN GOTO 2670
2670 IF I=360 THEN GOTO 2680
2680 IF I=0 THEN GOTO 1190
2690 IF I=90 THEN GOTO 2700
2700 IF I=180 THEN GOTO 2710
2710 IF I=270 THEN GOTO 2720
2720 IF I=360 THEN GOTO 2730
2730 IF I=0 THEN GOTO 1190
2740 IF I=90 THEN GOTO 2750
2750 IF I=180 THEN GOTO 2760
2760 IF I=270 THEN GOTO 2770
2770 IF I=360 THEN GOTO 2780
2780 IF I=0 THEN GOTO 1190
2790 IF I=90 THEN GOTO 2800
2800 IF I=180 THEN GOTO 2810
2810 IF I=270 THEN GOTO 2820
2820 IF I=360 THEN GOTO 2830
2830 IF I=0 THEN GOTO 1190
2840 IF I=90 THEN GOTO 2850
2850 IF I=180 THEN GOTO 2860
2860 IF I=270 THEN GOTO 2870
2870 IF I=360 THEN GOTO 2880
2880 IF I=0 THEN GOTO 1190
2890 IF I=90 THEN GOTO 2900
2900 IF I=180 THEN GOTO 2910
2910 IF I=270 THEN GOTO 2920
2920 IF I=360 THEN GOTO 2930
2930 IF I=0 THEN GOTO 1190
2940 IF I=90 THEN GOTO 2950
2950 IF I=180 THEN GOTO 2960
2960 IF I=270 THEN GOTO 2970
2970 IF I=360 THEN GOTO 2980
2980 IF I=0 THEN GOTO 1190
2990 IF I=90 THEN GOTO 3000
3000 IF I=180 THEN GOTO 3010
3010 IF I=270 THEN GOTO 3020
3020 IF I=360 THEN GOTO 3030
3030 IF I=0 THEN GOTO 1190
3040 IF I=90 THEN GOTO 3050
3050 IF I=180 THEN GOTO 3060
3060 IF I=270 THEN GOTO 3070
3070 IF I=360 THEN GOTO 3080
3080 IF I=0 THEN GOTO 1190
3090 IF I=90 THEN GOTO 3100
3100 IF I=180 THEN GOTO 3110
3110 IF I=270 THEN GOTO 3120
3120 IF I=360 THEN GOTO 3130
3130 IF I=0 THEN GOTO 1190
3140 IF I=90 THEN GOTO 3150
3150 IF I=180 THEN GOTO 3160
3160 IF I=270 THEN GOTO 3170
3170 IF I=360 THEN GOTO 3180
3180 IF I=0 THEN GOTO 1190
3190 IF I=
```



PEEKING the Amstrad's ROM

Part five of our in-depth Amstrad programming series by David Ellis shows you how a value can be returned to BASIC from a machine code routine

In my previous article I discussed how parameters could be passed via the new words, so the corresponding machine code routine in this article we will see how a value can also be returned to BASIC from a machine code routine.

You may have found it isn't possible to make a PEEK in the ROM on the Amstrad. Figure 1 shows why.

The ROM runs up 64K of memory from 0 to 65535, but the ROM also uses the same addresses in the RAM — from 0 to 65535 (64K) and 65536 to 65551 (16K) — therefore 'overlap' the ROM in the two positions shown. If you take a PEEK at any address, then it is the contents of the RAM which are returned.

The lower ROM contains the firmware routines, whilst the upper ROM contains the BASIC. Up to 255 expansion ROMs can replace the BASIC ROM as needed by means of bank switching. You could therefore have a PORT18 ROM, a PORT19 ROM etc and switch between these and other upper ROMs as required.

Although the 256 of ROM is physically contained in one ROM, it is treated as though it is two separate ROMs. In normal use, the operating system switches between the lower and upper ROMs as required and that is quite invisible to the user. This is accomplished by providing routines to enable bank on and bank off the upper and lower ROMs separately. These routines are available from a pamphlet as follows:

- 1 40900 Enable the upper ROM
- 2 40900 Disable the upper ROM
- 3 40908 Enable the lower ROM
- 4 40908 Disable the lower ROM

Taking a PEEK in the ROM is therefore a simple case of enabling the ROM as required,

Figure 1 and 2

Machine code routine to PEEK the lower ROM (LROM)			
Address	Mnemonic	Op Code	Comments
40000	CP 1	FE 1	set three two parameters!
40001	SET RT	CB	PARAM 1 not
40002	CALL ROM	CD 00 00	parameters 1 pointing to DE register
40003	CALL ROM	CD 00 00	parameters 2 pointing to HL register
40004	LD A,ROM	FD 00 00	load parameter 1 into the contents of the address pointed to by DE
40005	LD A,ROM	FD 00 00	load parameter 2 into the contents of the address pointed to by HL, i.e. to the variable ROM%
40006	CALL ROM	CD 00 00	call the LROM ROM
40007	RET	CB	return from routine

Machine code routine to PEEK the upper ROM (UROM)			
40000	CP 1	FE 1	constants as for LROM except that
40001	SET RT	CB	the UROM ROM is enabled instead
40002	CALL ROM	CD 00 00	
40003	CALL ROM	CD 00 00	points UPPER ROM
40004	LD A,ROM	FD 00 00	
40005	LD A,ROM	FD 00 00	
40006	CALL ROM	CD 00 00	calls the UPPER ROM
40007	RET	CB	

returning the value of the requested address, and then disabling the ROM before returning to BASIC.

We will do this by creating two new words — LROM and UROM. Two parameters will need to be passed with these words:

- 1 The address to 'PEEK' is

- 2 The address of the variable ROM%.

The first address should be in the range of 0 to 65535, or 40000 to 65551. Addresses within the range 40000 to 65535 will return the contents of RAM. The variable ROM% (which must be an integer —

hence the %p) will be declared first so that an address will exist for it. If this is not done, then an error message will be returned.

Setting an address for the lower ROM will then make the LROM

1 LROM, address, %ROM%

and similarly for the upper ROM it will be

1 UROM, address, %ROM%

Figures 1 and 2 show the machine code routines for these two new words. We first make sure that there are two parameters available, and if so then a CALL is made to the PARAMETER routine. This will place the address we wish to PEEK in the DE register pair, and the address of the variable ROM% in the HL register. The upper or lower ROM is then enabled and the value of the address we require to be placed in the variable ROM%. The upper or lower ROM is then disabled,

Listing 3 Basic program to PEEK the lower and upper ROM

```

10 MODE 3:DEFINT a%ROM%:PRINT "LOWER ROM"
20 FOR address = 0 TO 65535
30 LROM,address,%ROM%:DOUB 1000:NEXT
40 PRINT:PRINT:PRINT "-----"
50 FOR address = 65536 TO 65551
60 UROM,address,%ROM%:DOUB 1000:NEXT
70 END
1000 IF ROM%>31 AND ROM%<128 THEN PRINT CHR$(ROM%)
1010 IF ROM%>160 THEN PRINT CHR$(ROM%-128)
1020 RETURN
  
```



PRINT ROM%, NEXT ADDRESS

The BASIC program in listing 3 is interesting in that it searches both the upper and lower ROMs for ASCII characters between 32 and 127. If the program and you should see quite a few interesting words amongst the 'garbage' which is printed out.

Hopefully if you add these

GOODBYTE

ADDRESS	DATA	ADDRESS	DATA
0000	0000	0000	0000
0001	0001	0001	0001
0002	0002	0002	0002
0003	0003	0003	0003
0004	0004	0004	0004
0005	0005	0005	0005
0006	0006	0006	0006
0007	0007	0007	0007
0008	0008	0008	0008
0009	0009	0009	0009
000A	000A	000A	000A
000B	000B	000B	000B
000C	000C	000C	000C
000D	000D	000D	000D
000E	000E	000E	000E
000F	000F	000F	000F
0010	0010	0010	0010
0011	0011	0011	0011
0012	0012	0012	0012
0013	0013	0013	0013
0014	0014	0014	0014
0015	0015	0015	0015
0016	0016	0016	0016
0017	0017	0017	0017
0018	0018	0018	0018
0019	0019	0019	0019
001A	001A	001A	001A
001B	001B	001B	001B
001C	001C	001C	001C
001D	001D	001D	001D
001E	001E	001E	001E
001F	001F	001F	001F
0020	0020	0020	0020
0021	0021	0021	0021
0022	0022	0022	0022
0023	0023	0023	0023
0024	0024	0024	0024
0025	0025	0025	0025
0026	0026	0026	0026
0027	0027	0027	0027
0028	0028	0028	0028
0029	0029	0029	0029
002A	002A	002A	002A
002B	002B	002B	002B
002C	002C	002C	002C
002D	002D	002D	002D
002E	002E	002E	002E
002F	002F	002F	002F
0030	0030	0030	0030
0031	0031	0031	0031
0032	0032	0032	0032
0033	0033	0033	0033
0034	0034	0034	0034
0035	0035	0035	0035
0036	0036	0036	0036
0037	0037	0037	0037
0038	0038	0038	0038
0039	0039	0039	0039
003A	003A	003A	003A
003B	003B	003B	003B
003C	003C	003C	003C
003D	003D	003D	003D
003E	003E	003E	003E
003F	003F	003F	003F
0040	0040	0040	0040
0041	0041	0041	0041
0042	0042	0042	0042
0043	0043	0043	0043
0044	0044	0044	0044
0045	0045	0045	0045
0046	0046	0046	0046
0047	0047	0047	0047
0048	0048	0048	0048
0049	0049	0049	0049
004A	004A	004A	004A
004B	004B	004B	004B
004C	004C	004C	004C
004D	004D	004D	004D
004E	004E	004E	004E
004F	004F	004F	004F
0050	0050	0050	0050
0051	0051	0051	0051
0052	0052	0052	0052
0053	0053	0053	0053
0054	0054	0054	0054
0055	0055	0055	0055
0056	0056	0056	0056
0057	0057	0057	0057
0058	0058	0058	0058
0059	0059	0059	0059
005A	005A	005A	005A
005B	005B	005B	005B
005C	005C	005C	005C
005D	005D	005D	005D
005E	005E	005E	005E
005F	005F	005F	005F
0060	0060	0060	0060
0061	0061	0061	0061
0062	0062	0062	0062
0063	0063	0063	0063
0064	0064	0064	0064
0065	0065	0065	0065
0066	0066	0066	0066
0067	0067	0067	0067
0068	0068	0068	0068
0069	0069	0069	0069
006A	006A	006A	006A
006B	006B	006B	006B
006C	006C	006C	006C
006D	006D	006D	006D
006E	006E	006E	006E
006F	006F	006F	006F
0070	0070	0070	0070
0071	0071	0071	0071
0072	0072	0072	0072
0073	0073	0073	0073
0074	0074	0074	0074
0075	0075	0075	0075
0076	0076	0076	0076
0077	0077	0077	0077
0078	0078	0078	0078
0079	0079	0079	0079
007A	007A	007A	007A
007B	007B	007B	007B
007C	007C	007C	007C
007D	007D	007D	007D
007E	007E	007E	007E
007F	007F	007F	007F
0080	0080	0080	0080
0081	0081	0081	0081
0082	0082	0082	0082
0083	0083	0083	0083
0084	0084	0084	0084
0085	0085	0085	0085
0086	0086	0086	0086
0087	0087	0087	0087
0088	0088	0088	0088
0089	0089	0089	0089
008A	008A	008A	008A
008B	008B	008B	008B
008C	008C	008C	008C
008D	008D	008D	008D
008E	008E	008E	008E
008F	008F	008F	008F
0090	0090	0090	0090
0091	0091	0091	0091
0092	0092	0092	0092
0093	0093	0093	0093
0094	0094	0094	0094
0095	0095	0095	0095
0096	0096	0096	0096
0097	0097	0097	0097
0098	0098	0098	0098
0099	0099	0099	0099
009A	009A	009A	009A
009B	009B	009B	009B
009C	009C	009C	009C
009D	009D	009D	009D
009E	009E	009E	009E
009F	009F	009F	009F
00A0	00A0	00A0	00A0
00A1	00A1	00A1	00A1
00A2	00A2	00A2	00A2
00A3	00A3	00A3	00A3
00A4	00A4	00A4	00A4
00A5	00A5	00A5	00A5
00A6	00A6	00A6	00A6
00A7	00A7	00A7	00A7
00A8	00A8	00A8	00A8
00A9	00A9	00A9	00A9
00AA	00AA	00AA	00AA
00AB	00AB	00AB	00AB
00AC	00AC	00AC	00AC
00AD	00AD	00AD	00AD
00AE	00AE	00AE	00AE
00AF	00AF	00AF	00AF
00B0	00B0	00B0	00B0
00B1	00B1	00B1	00B1
00B2	00B2	00B2	00B2
00B3	00B3	00B3	00B3
00B4	00B4	00B4	00B4
00B5	00B5	00B5	00B5
00B6	00B6	00B6	00B6
00B7	00B7	00B7	00B7
00B8	00B8	00B8	00B8
00B9	00B9	00B9	00B9
00BA	00BA	00BA	00BA
00BB	00BB	00BB	00BB
00BC	00BC	00BC	00BC
00BD	00BD	00BD	00BD
00BE	00BE	00BE	00BE
00BF	00BF	00BF	00BF
00C0	00C0	00C0	00C0
00C1	00C1	00C1	00C1
00C2	00C2	00C2	00C2
00C3	00C3	00C3	00C3
00C4	00C4	00C4	00C4
00C5	00C5	00C5	00C5
00C6	00C6	00C6	00C6
00C7	00C7	00C7	00C7
00C8	00C8	00C8	00C8
00C9	00C9	00C9	00C9
00CA	00CA	00CA	00CA
00CB	00CB	00CB	00CB
00CC	00CC	00CC	00CC
00CD	00CD	00CD	00CD
00CE	00CE	00CE	00CE
00CF	00CF	00CF	00CF
00D0	00D0	00D0	00D0
00D1	00D1	00D1	00D1
00D2	00D2	00D2	00D2
00D3	00D3	00D3	00D3
00D4	00D4	00D4	00D4
00D5	00D5	00D5	00D5
00D6	00D6	00D6	00D6
00D7	00D7	00D7	00D7
00D8	00D8	00D8	00D8
00D9	00D9	00D9	00D9
00DA	00DA	00DA	00DA
00DB	00DB	00DB	00DB
00DC	00DC	00DC	00DC
00DD	00DD	00DD	00DD
00DE	00DE	00DE	00DE
00DF	00DF	00DF	00DF
00E0	00E0	00E0	00E0
00E1	00E1	00E1	00E1
00E2	00E2	00E2	00E2
00E3	00E3	00E3	00E3
00E4	00E4	00E4	00E4
00E5	00E5	00E5	00E5
00E6	00E6	00E6	00E6
00E7	00E7	00E7	00E7
00E8	00E8	00E8	00E8
00E9	00E9	00E9	00E9
00EA	00EA	00EA	00EA
00EB	00EB	00EB	00EB
00EC	00EC	00EC	00EC
00ED	00ED	00ED	00ED
00EE	00EE	00EE	00EE
00EF	00EF	00EF	00EF
00F0	00F0	00F0	00F0
00F1	00F1	00F1	00F1
00F2	00F2	00F2	00F2
00F3	00F3	00F3	00F3
00F4	00F4	00F4	00F4
00F5	00F5	00F5	00F5
00F6	00F6	00F6	00F6
00F7	00F7	00F7	00F7
00F8	00F8	00F8	00F8
00F9	00F9	00F9	00F9
00FA	00FA	00FA	00FA
00FB	00FB	00FB	00FB
00FC	00FC	00FC	00FC
00FD	00FD	00FD	00FD
00FE	00FE	00FE	00FE
00FF	00FF	00FF	00FF

and we return to BASIC. The ROM value is returned by printing ROM%.

For example, to take a look at the first 100 bytes of the lower ROM the following program could be used:

```
10 ROM% = 0
20 FOR I = 0 TO 99
30 PRINT ROM, ADDRESS, I, ROM%
```

Two new words in the poem already created (see previous article) if in doubt! you will be able to disassemble some of the addresses in both the upper and lower ROMs. Let BASIC know if you find any useful ones as we may be able to put these to good use.

Next week we will continue with some more new words including UNROL, DROOL, MOVE and ZEOO.

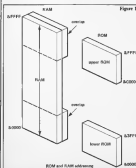


Figure 1

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Variable
0.01 fraction of hour car
2.5 hours all cars
5 hours
1.51 to 5.00 road
0.01 to 0.05
0.01 to 0.05
0.01 to 0.05
0.01 to 0.05
0.01 to 0.05

Listing 1

```
10 REMARKS: VIC-30
11 REMARKS: VIC-30
12 REMARKS: VIC-30
13 REMARKS: VIC-30
14 REMARKS: VIC-30
15 REMARKS: VIC-30
16 REMARKS: VIC-30
17 REMARKS: VIC-30
18 REMARKS: VIC-30
19 REMARKS: VIC-30
20 REMARKS: VIC-30
21 REMARKS: VIC-30
22 REMARKS: VIC-30
23 REMARKS: VIC-30
24 REMARKS: VIC-30
25 REMARKS: VIC-30
26 REMARKS: VIC-30
27 REMARKS: VIC-30
28 REMARKS: VIC-30
29 REMARKS: VIC-30
30 REMARKS: VIC-30
31 REMARKS: VIC-30
32 REMARKS: VIC-30
33 REMARKS: VIC-30
34 REMARKS: VIC-30
35 REMARKS: VIC-30
36 REMARKS: VIC-30
37 REMARKS: VIC-30
38 REMARKS: VIC-30
39 REMARKS: VIC-30
40 REMARKS: VIC-30
41 REMARKS: VIC-30
42 REMARKS: VIC-30
43 REMARKS: VIC-30
44 REMARKS: VIC-30
45 REMARKS: VIC-30
46 REMARKS: VIC-30
47 REMARKS: VIC-30
48 REMARKS: VIC-30
49 REMARKS: VIC-30
50 REMARKS: VIC-30
51 REMARKS: VIC-30
52 REMARKS: VIC-30
53 REMARKS: VIC-30
54 REMARKS: VIC-30
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56 REMARKS: VIC-30
57 REMARKS: VIC-30
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61 REMARKS: VIC-30
62 REMARKS: VIC-30
63 REMARKS: VIC-30
64 REMARKS: VIC-30
65 REMARKS: VIC-30
66 REMARKS: VIC-30
67 REMARKS: VIC-30
68 REMARKS: VIC-30
69 REMARKS: VIC-30
70 REMARKS: VIC-30
71 REMARKS: VIC-30
72 REMARKS: VIC-30
73 REMARKS: VIC-30
74 REMARKS: VIC-30
75 REMARKS: VIC-30
76 REMARKS: VIC-30
77 REMARKS: VIC-30
78 REMARKS: VIC-30
79 REMARKS: VIC-30
80 REMARKS: VIC-30
81 REMARKS: VIC-30
82 REMARKS: VIC-30
83 REMARKS: VIC-30
84 REMARKS: VIC-30
85 REMARKS: VIC-30
86 REMARKS: VIC-30
87 REMARKS: VIC-30
88 REMARKS: VIC-30
89 REMARKS: VIC-30
90 REMARKS: VIC-30
91 REMARKS: VIC-30
92 REMARKS: VIC-30
93 REMARKS: VIC-30
94 REMARKS: VIC-30
95 REMARKS: VIC-30
96 REMARKS: VIC-30
97 REMARKS: VIC-30
98 REMARKS: VIC-30
99 REMARKS: VIC-30
100 REMARKS: VIC-30
```

```

46 PRINT"THE BLACK CAR IS THE POWER RACER 50000....."
47 PRINT"STAY IN THE RACE STEER THE CAR FAST THE OTHERS....."
48 PRINT"USE YOUR SKILL TO KEEP THE CAR MOVING..... IF YOU STOP FOR MORE THA
N 3"
49 PRINT"SOON YOU'LL BE DIFFICULT FOR....."
50 PRINT"COMPLETE 10 LAPS AND YOU WILL BE ENTERED IN A MORE DIFFICULT RACE....
."
51 PRINT"HIT SPACE TO CONTINUE"
52 POKE190,0
53 GETW:(GAW:)" THEN
54 PRINT"THE POWER RACER 50000"
55 PRINT"TO SCORE AS MANY POINTS AS YOU CAN BY COMPLETING EACH 10 LAP RAC
E....."
56 PRINT"YOU HAVE 3 LIVES....."
57 PRINT"USE KEYS R,L,H & Z"
58 PRINT"PRESS SHIFT & RUN/STOP TO LOAD NEW PROG...."
59 NEW

```

Label 1

```

45 POKE655,255
47 G=0:LC=0:LC=0
49 LP=0:LC=0
50 PA=INT"LP":POKE3875,255+C:POKE3875+2+255+10+255+10+4*Y+5*H+5*LC=0
51 G=557+100+5575+50+555+100+555+104+555+100+557+100+555+107+5125
52 G=7555+100+75510+5575+10+5575+10+5575+10+5575+10+5575+10+5575+10+5575+10
53 POKE3875+755+7575+10POKE3875+31POKE3875+C,51NEXT5
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140 POKE3875+755+7575+10POKE3875+31POKE3875+C,51NEXT5

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UNEXPANDED VIC-20 PROGRAM

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150 FOR I=1 TO 10, B1=POKE16+4, B1=POKE16+4, B1=POKE16+4, B1=POKE16+4, B
155 SP=POKE16+4+Y=1:POKE16+4+Y=1:POKE16+4+Y=1:POKE16+4+Y=1:POKE16+4+Y=1:THEND50
160 SP=POKE16+4+Y=1:THEND50
165 SP=POKE16+4+Y=1:THEND50
170 SP=POKE16+4+Y=1:THEND50
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Fly, drive or hitch — Can 003.5 get the secrets home? Use your skills to choose appropriate transport on each stage of the journey. BBC Disk only £11.99

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Is there life after the DTI offer?

Now that the billion-pound DTI offer to schools has ended, the question is, what will the market turn out to be?

Without a doubt, Acorn's share of the market, some 82.5% up to last September with one month to go, means a future for the BBC computer for a long time to come. Whatever the developments and expansion of the new market, pressure from schools to make the most of their computers will encourage manufacturers to continue developing new ideas.

Writing is an obvious problem. Schools haven't had to actively advertise the presence of words — the DTI has done that. Time to think of a writer's computer, not just the display of a suitable message while waiting at the computer. There is room for a device as a ROM chip that will display the name and address of the school concerned — but not at today's over-inflated price. This seems an ideal feature finally for suppliers to use when tempting schools to buy subsequent machines, although the overall price of the BBC boxes set to continue falling if sales are to continue.

The great peripheral risk is an — disc drive and an obvious danger and the market has become much more competitive over the last year. However, many schools are giving thought to a printer as the essential new add-on.

Prepare for a full-scale assault on the next Move a the target of the market. The computer is seen as an answer to the educational teacher's prayers. The network, central facilities on the BBC are now available. Add the power of Micro System from Island Logic, a real help in £24.95, and children will become instant computer users.

John Henderson kicks off a new occasional series, looking at the BBC and education

Micro Systems may seem expensive, but it's a real gem of a package. There are five modes of operation. A full Editor allows children to create their own messages and enter a whole message. Keyboard provides a pseudo-keyboard for use, and Synthesiser allows musical stanzas to be created and saved.

The Printer option is self-explanatory, and hard copies are becoming increasingly important in the life of school children — someone always demands to see results on paper.

The space is quite comparable and it works! So many programs with printer options fail to consider the reality of printers. The battle between the BBC computer and non-BBC food continues. One convenience is the option of a Locker program. This allows up to 10 messages to be linked together. Children could be telling the truth when they've done home and class to best results.

a masterpiece.

A suitable collection of sample words is also contained in the package, so does too. This adds to the user-friendly emphasis of this whole package — a must for schools and a real alternative to the personal recorder and notes.

There has been great interest in the use of word processors to free children from the constraints of writing and allow the creative spirit to take over. The new Wordwise Plus package will enable schools already familiar with word processing to easily go to work. The new features include a sector index to give pieces of text ready for input as a document, a full-size reminder of the dictionary is on, and a way of reversing the words after use — perhaps the most interesting aspect of original Wordwise.

Each school deserves a machine on the DTI scheme that received software from the BBC as a free gift.

Facile, a simple database program, proved useful for interdisciplinary work and many schools will be interested in a new range of programs under the title Facile for Son of Facile — CUP.00.

This concept of the Facile program, with suitable amendments, and a choice of type or dot-matrix system — someone's thinking of the needs of a busy school. Facile allows details spread on Facile to be displayed in the form of bar charts or scattergrams, thus providing the flexibility of the program. Also included are three sample displays, a Copy option, allowing the transfer of files to and from tape or disk, and a Printer option.

However, the latter falls into the obvious trap and won't work with some popular printers — the late-fall bugs should really be sorted out before these materials are marketed.

Cambridge University Press has started to send out Facile on a steady-state trial basis. Perhaps it's time to send schools and keep the pricey equipment.

There has been plenty of interest in the full implementation of LOGO materials for the BBC, and plenty of printers and displays. The main facilities available are off on the price of these packages, and the time involved in learning how to use them. Many schools are starting with the less sophisticated versions of LOGO and allowing more children time to develop ideas.

Plans for the computer-aided teacher look not too well under way. School trials are almost complete and material is due to schools this summer.

Meanwhile the POOD case continues — a sign of the real quality software which has been forwarded to a PPS.



Commodore special

**We've got a
light pen and a
logic circuit
analyser for
you this week**



Light Pen C64 £28

Stock Computer Services, Free post, Botic, Monoprice L28 S&D

The light pen has always been an invaluable and uncomputerised device. It is also of value as an aid in education and for drawing and computer art. Thanks to the 64's hardware, the pen simply plugs into joystick port one and the co-ordinates of a point on the screen is obtained by interrupting two registers.

The pen comes with two cursors. The first contains 10 points and the second a series of routines for the traditional high resolution designs.

The pen comes with an excellent handbook which gives detailed information on how the pen operates and how to program it. The pen will operate in two modes of resolution. First it will identify eight by eight blocks of pixels (a normal character) with a resolution of 25 rows of 40 characters.

Secondly, it will recognise individual pixels giving a resolution of 120 by 200. The games supplied use the low resolution mode. The operation of the pen is simple. You point it at the selected area of screen and reach two metal contacts. When the contacts are closed, the software interprets the

relevant registers and the co-ordinates of the pen tip obtained.

The games supplied include *Cyberia*, *Dragonst*, *Life* and a command generator. The standard of the games was pleasantly average and they are more of value as sources of ideas than as games. The high resolution package, on the other hand, is first class. Using the software you can draw lines, circles, quadrilaterals, or draw freehand on two screens.

There is also a wide range of commands including fill, invert, zoom, pen swapping, moving screens and just like copying, stretch, which enable you to produce complex designs and pictures. A routine for producing hard copies is a welcome addition.

Stock is clearly keen to push the computer aided design capabilities of the pen and supplies electrical and mechanical templates as well. I can certainly imagine the average car workshop such as used to help plane fairs on, but I can't quite see the 64 as a real CAD computer.

This is an excellent product, which is good value even if you have only the 10 points, which came free. The hardware is well made and the instruction first rate.

A.W.

instructions	85%
overall use	85%
graphics	N/A
value for money	90%

★★★★

Digital Lab C64 — disc

Digital Lab is a well thought out program which allows you to analyse logic circuits and construct logic on the screen. The manual which accompanies the disc is very clearly written for the end user and is printed on high quality paper.

A spread sheet type of approach is adopted in the building up of the logic circuits. This sheet consists of 56 rows and 59 columns. To build up a circuit is very simple. You make the cursor in the required position on the spreadsheet and press RETURN to freeze on to the cell.

Pressing return also activates the menu screen. The menu consists of various logic elements, e.g., a two input AND gate, an inverter, lobe and junction etc. You move on to the symbol required and press RETURN again and a copy of the symbol will immediately appear in your chosen cell. You repeat this process, moving round the spreadsheet adding in symbols and links as you go.

The program has built-in validity checks which prevent you creating impossible connections as you are doing. For example, a device having three outputs cannot be simultaneously followed by one having a single input. You have

to specify by means of the link symbols where each of the outputs go.

However, the purpose of the program is to analyse the circuit you have constructed. You have the facility to label every input and every output using letters of the alphabet, i.e. A, B, C, etc. The program then carries out a logic analysis and displays a truth table for your circuit. The truth table is displayed on a window superimposed over your circuit and when the truth table is large you can scroll it, if necessary, independently of the circuit.

Finally, disc handling routines allow you to save your circuit to disc as a file, resume or delete it.

I can't think the program or the 23-page manual. The program never crashed and it always behaved as expected. The manual contains several keyboard shortcuts which worked excellently. It was very clearly written and so working through it I did not encounter any pressing errors.

I can only think of ways of extending the package. I would have liked a print out option which would allow the circuit and truth table to be dumped on a printer, clearly with options for non-Commodore printers.

A.C.

instructions	90%
overall use	80%
graphics	90%
value for money	85%

★★★★


```

510IFY=29 AND X=33 THEN D=D-2:GOTO1, SOUND1, -15, 60, 1:GOTO 560
520IFY=29 AND X=33+1 THEN D=D-2:GOTO1, SOUND1, -15, 60, 1:GOTO 560
530IFY=29 AND X=33+2 THEN D=D-2:GOTO1, SOUND1, -15, 60, 1:GOTO 560
540IFY=29 AND X=33+1 AND D=4 THEN D=D+5:GOTO1, -15, 60, 1:GOTO 560
550IFY=29 AND X=33+3 AND D=7 THEN D=D+5+1:GOTO1, -15, 60, 1:GOTO 560
560GOTO1:ENDY=100
570 GOTO500
580IFW=0 AND X=1 THEN X=X+1:PRINTTAB(X*3, 30): " " :PRINTTAB(X*3, 30):END
590IFW=0 AND X=24 THEN X=X+1:PRINTTAB(X*3, 1, 30): " " :PRINTTAB(X*3, 30):END
600 GOTO500
610PRINTTAB(17, 35): " " :PRINTTAB(17, 0) ELI
620GOTO360
630END
640PRINTTAB(11, 10):CHR$(141)+CHR$(132)+"BACKY SATS "
650PRINTTAB(11, 20):CHR$(141)+CHR$(134)+"BACKY SATS "
660PRINTTAB(15, 45):CHR$(137)+"You scored "PTR; points;"
670IFW=40 THEN PRINTTAB(5, 50):CHR$(130)+"That's a high score!" :W=0 ELSE PRINT
TAB(5, 50):CHR$(131)+"The high score is "PTR; points;"
680W=31,0
690 PRINTTAB(5, 20):CHR$(132)+"ANOTHER GO (Y/N)?":INPUTW
700 IFW=0 THEN GOTO ELSE W=0
710GOTO500
720PRINTTAB(13, 50): "BACKY SATS"
730GOTO500
740PRINTTAB(10, 50):CHR$(144)+CHR$(145)+CHR$(146)+".....your sat's
750GOTO500
760PRINTTAB(10, 70):CHR$(147)+".....the sat's"
770PRINTTAB(15, 90): ".....move right"
780PRINTTAB(10, 110): ".....move left"
790GOTO
800W=0
810FORC=1 TO 500:NEXTC
820GOTO 500

```

Programs are always supplied on cassette and are accompanied by full details of the program variables, how the program works and any limits on conversion you can offer. Please type these details double spaced. Listings are helpful but not essential. What is vital is that the programs should be completely error free, so please double check.

Always use a coupon family fixed to the back of your envelope, and fully complete and enclose the cassette index card.

We are particularly interested in programs with less than 100 actual lines of BASIC. All submissions are acknowledged.

Send your programs to HCW!

Use the resource below and the answer key.

Figure 1 *Estimated number of people in the United States with a history of a mental disorder, by age group and sex, 1990-2000*

1000

1000

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Age Group	Percentage
18-24	18%
25-34	22%
35-44	15%
45-54	12%
55-64	10%
65-74	8%
75-84	5%
85+	3%

[illegible]



The world of sprites

One of the best features of the Commodore 64 is it's sprite graphics feature. Sprites take users to memorable objects, look as if they are real, and are defined characters which can be moved around very easily from BASIC.

The normal method of using "sprites" on other machines is to plot each point of the object one at a time, until the whole object is built up. This takes up a lot of processor time, and can usually only be done in machine code. Also, as the sprites are really on the test screen, each 8 x 8 square can normally only have one colour, and this also leads to odd effects when two of these "pseudo-sprites" meet or overlap, and usually means to be as perfect as destroyed by the new picture.

The 64, however, has a separate video chip to do all the work for you, and it can move sprites around virtually instantaneously, and also offers more sprite-handling facilities. The 64's sprites are not part of the test screen, and can be moved and coloured completely independently. Individual sprites can be programmed to pass behind or in front of the layer of 144 and each other. Colours, too, are improved on the 64: sprites can have up to three colours, plus the background, and there can be different to the test colours used, which can also have the three colours per square, so up to seven colours can appear in any 8 x 8 square on the screen.

An interesting bonus of this graphical wizardry is that it uses up no more of the computer's BASIC memory. Up to eight sprites can appear on the screen at once, though any amount of sprite data may be defined in memory for use later.

The location of the 64 is generally unimportant (it is directly transferable with anything else) as a simple pointer tells the video chip where to look for each sprite. These pointers are located at memory addresses 3282 to 3285 for sprites 0-3 respectively. The number at these locations is one-hundredth of the actual start address of the sprite data. Hence if your sprite data begins at 704, the value of the sprite pointer will be 704/64 = 11.

More than one of the pointers may point to the same data area, e.g. all pointers could be set to 11, resulting in eight

Have fun playing around with sprites on your Commodore 64. Iain Murray explains all

identical sprites on the screen. The sprites have a screen priority, dependent on their number, though they can individually be set to pass behind or in front of the test layer. Hence 115 effects are very easy to create.

The sprite data itself consists of 63 consecutive bytes of memory. Each bit of the byte per layer can either be "on" or "off" (zero or one), and this pattern corresponds to the shape of the sprite which are to be in, or not, e.g. if location 704 contains, say, 70, the first byte of the sprite would be:

make sure the programs you use can print out the sprite data to the screen, or a printer.

As mentioned earlier, the sprite memory locations pointers are at locations 3282 to 3285, and give the start location of the sprite data. The other sprite functions are controlled from a block of memory starting at 32344 up to 32394. From BASIC, this block is usually accessed by setting a variable, often 55 or V, to 32344 and adding on the required amount for the other locations. This is the method employed in the following descriptions.

up to only 255 are possible in memory locations, another register is needed to fully specify the C co-ordinates. This is at V + 16, and for each bit set in this register, the corresponding sprite will appear on the right hand part of the screen, e.g. to get sprite 8 at X = 160 and Y = 100, type:

```
POKE V + 16, POKE V, 800
255-POKE V + 1, 250
```

V + 31, V + 32: Normal screen background and border colours are in this data block (32388, 32390). Colours are given by the amounts 0-15 (0-black, 1-white, 2-red, etc).

V + 39 - V + 46: These registers contain the colours of sprites 0-7 respectively. The numbers of the colours are as for the screen and border colours.

V + 54: Sprite enable register. Bit 0-7 are enabled (enabled or not). Hence, to set a sprite, it's bit in this register must be set to a "1" e.g. to turn on sprite 6, type POKE V + 21, 64 (bit 2 to



This gives us directly the pixel pattern of the sprite on the screen — but "on" will appear to the sprite colour, while those "off" will seem transparent, allowing the background colour to show through holes in the sprite. These bytes of pixels are arranged in three columns of bytes with 31 bytes in each column, giving a sprite with 28 x 31 pixels.

For normal BASIC programs, the sprite data is stored in DATA statements, and it is POKE'd into memory at the start of the program ready to be manipulated as required.

Obviously, with a complicated sprite, the data may take a while to calculate from a standstill, but a number of sprite creation programs have been published. These allow you to set the sprite on the screen as you create it, and you won't be concerned with the number at all. However, if you plan to use the sprite in another program,

Other graphics modes also have data storage in the memory area, but we will only look at those concerned with sprites at the moment.

V - V + 15: X and Y co-ordinates for sprites 0-7. These registers contain the X and Y co-ordinates of the sprites, with respect to an origin at the top left of the screen. There is a border around the screen, and hence sprites can move off screen under this border, like a picture behind a frame. The actual co-ordinates of the visible part of the screen are as follows:

```
X = 34, Y = 40 X = 164, Y = 50
X = 34, Y = 234 X = 164, Y = 250
```

Hence any part of a sprite outside this range will be partly obscured by the screen border.

V + 16, X co-ordinate most significant bit (MSB). As values

the power 4 = 64.

V + 24, Y + 25: Vertical and horizontal expansion. As with the sprite enable register, each bit of these registers corresponds to a particular sprite, but in these registers a set bit indicates that a sprite will be double its normal size in that direction, and hence give four possible sprite dimensions (wide, high, long, tall).

V + 27: Background priority. Normally, sprites will pass in front of the test on the screen, but setting the appropriate bit in this register will place the sprites to pass behind the test layer.

V + 36, V + 37: These locations contain the POKE'd on, but by POKE'ing at these will give sprite collision details. Set on in V + 36 indicates that the corresponding sprite is in collision with another sprite. Similarly, bit on in V + 37 indicates a collision bit with that

The world of sprites

sprite and a text character on the screen.

These registers do not affect the movement of the sprites, but make software developers very easy: those parts of the sprite which are visible will collide with it.

V+35a Sprite multicolour select. Normal sprites are all one colour, but using the register bit in this register will put a sprite into multicolour mode. Now the sprite data is read by the computer in bits pairs — pairs of pixels on the screen. If both are on, then those pixels are invisible as before. If only the left hand pair is on then **RIGHT** pixels will be the sprite colour as before.

If only the right hand pair is on then both will be sprite multicolour 2. This colour is at location **V+37d** and if both are on then they will both be sprite multicolour 3 (at **V+39**). These colours are defined as for the screen colours, but unlike the sprite colour registers, these two colours are common to all multicolour sprites. Multicolour mode allows game developers to be lush up.

There are 16 functions available on the 64 to manipulate the sprite picture blocks. A good deal of fun can be had from playing around with sprites.



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Brain stretching!



This is a computerized version of the familiar game of Simon. The computer will play a sequence of musical notes and display colored blocks on the screen. You must try to repeat the sequence using the keys B, Y, C, R.

Each time you complete the sequence, you will score one point and the length of the sequence will increase by one. To make life more difficult, you must complete the sequence before the run-out of time. Your time limit is determined by the difficulty level, which you can choose at the start of the game.

Notes on conversion

This game was made for the famous pocket-size Commodore machines and converted to something other than the Commodore or VIC-20 would necessitate completely rewriting the program.

Commodore 64 owners might find the following hints useful:

1. **SCHLDR** is used to clear the screen.
2. **DO...LOOP UNTIL** loops must be replaced with a conditional **GOTO** jump.
3. The speed commands must be **POKE**ed in.

How it works

40 colors and graphics mode and displays the start Commodore box.

- 80-90: title
- 100-104: on images
- 110-114: instructions
- 120-130: wait for system and random program
- 140: clear screen
- 150-160: select difficulty level
- 170-175: main control loop
- 180-185: display current sequence
- 190-194: game notes
- 200-210: run program again
- 220-230: return mainline loop

Speed

- 120-130: display graphics
- 140-150: color data to 80
- 160-170: display graphics blocks and music sound

Variables

- AC: score
- BC: sequence of notes
- 25: length of sequence
- A-X: random number seed factor
- C1: returning of AC
- MSB: hold messages
- 10,20,30,40,50,60,70: random
- 60: user time

Use your powers of memory in this Simon-type game by PCW regular Steve Lucas. It's for both the C16 and Plus4.



```

80 REM ## "FLASH" ##
85 REM ## "A GAME OF MEMORY FOR THE COMMODORE 64/PLUS 4" ##
90 REM ## STEVE LUCKE ... JANUARY 1985 ##
40 PRINTCHR$(148);CHR$(150)
50 IF""(FOR X=1 TO 10)END;CHR$(150);CHR$(150)
60 SOUND 1
70 PRINT"#####WASH"
80 DIM M$(10)FOR X=1 TO 5:END M$(X)=INT RND
90 DATA "WATCH", "HOW REPEAT", "CORRECT", "WRONG", "THE CORRECT SEQUENCE WAS"
100 DATA "TOO SLOW"
110 PRINT"#####A GAME OF MEMORY FOR THE 64/PLUS 4"
120 PRINT"#####WATCH THE SCREEN WHILE COLOURED SQUARES FLASH IN A RANDOM SEQUENCE.
"
130 PRINTPRINT" YOU MUST TRY TO REPEAT THE SEQUENCE USING THE KEYS"##
140 PRINT"#####"
150 PRINT"#####PRESS THE (SPACE BAR) TO START THE GAME."
160 GOTO 20
170 END:GOTO 10
180 IF 20<1 " " THEN 160
190 SOUND 1
200 PRINT"##### PLEASE SELECT THE DIFFICULTY LEVEL. ##"
210 PRINT"1). EASY"
220 PRINT"2). MEDIUM"
230 GET 20:IF 20<1 " " THEN 20:ELSE IF 20=10 " " THEN 20:ELSE 230
240 SOUNDCHR$(150)FOR X=1 TO 10:END X IS USED TO HOLD THE SEQUENCE##
250 GOTO 20
260 SOUND 400:REM ##ADD A LETTER TO THE SEQUENCE HOLD IN R###
270 SOUND 500:REM ##DISPLAY THE BOX##
280 SOUND 500:REM ##TRY TO REPEAT THE SEQUENCE##
290 IF 10<1000 THEN SOUNDPRINT"#####PRESS(150)GOTO 230
300 IF 1500<10000 THEN PRINT"#####(150)GOTO 230
310 SOUND 1
320 LOOP UNTIL 1000
330 PRINT"#####PRESS(150)
340 FOR X=1 TO 10:END X:END
350 REM ##DISPLAY THE CORRECT SEQUENCE ##
360 FOR X=1 TO 10:END:GOTO 20:END
370 SOUND 1
380 PRINT"#####YOUR SCORE IS "##
390 PRINT"#####PRESS THE (SPACE BAR) FOR ANOTHER GAME."
400 GET 20
410 IF 20<1 " " THEN 400
420 END
430 END
440 REM ##SUBROUTINE TO SELECT RANDOM LETTER AND ADD IT TO R###
450 PRINTCHR$(150);CHR$(150)

```

C10/PLUS 4 PROGRAM

```

455 IF A=1 THEN A=100
475 IF A=2 THEN A=100
485 IF A=3 THEN A=100
495 IF A=4 THEN A=100
505 IF A=5 OR A=1 THEN 455
515 B=50000
525 RETURN
535 REM **DISPLAY THE SEQUENCE**
545 S=0
555 PRINT"*****"
565 FOR N=1 TO 100:NEXT N ** ADJUST THE TIME DELAY TO SUIT **
575 S=0
585 N=LEN(S)+1
595 G
605 G=MOD(G+1,1)
615 IF G=0 THEN S=S+1:ELSE IF G=1 THEN S=S+2:ELSE IF G=2 THEN S=S+3
625 IF G=3 THEN S=S+4
635 ON S GOTO 605,605,605,1000
645 FOR N=1 TO 100:NEXT N
655 N=N+1
665 LOOP UNTIL N=100
675 RETURN
685 SCHEDULE="*****"
695 FOR K=1 TO 100:NEXT K ** ADJUST TIME DELAY TO SUIT **
705 T=IN-1
715 T=T+1
725 G=0
735 IF A=100 AND A=100 AND A=100 AND A=100 THEN 705
745 N=N+1
755 IF A=0 THEN GOTO 605:ELSE IF A=1 THEN GOTO 605
765 IF A=2 THEN GOTO 605:ELSE IF A=3 THEN GOTO 1000
775 IF IN-1>100 THEN RETURN
785 IF IN-1>0 OR T=0 THEN RETURN
795 GOTO 715
805 RETURN
815 REM **DISPLAY THE GRAPHIC BLOCK**
825 PRINT"*****"
835 FOR N=1 TO 5
845 PRINT"*****"
855 NEXT N
865 VOL 7
875 SOUND 1,500,XX/2
885 RETURN
895 PRINT"*****"
905 FOR N=1 TO 5
915 PRINT"*****"
925 NEXT N
935 VOL 7
945 SOUND 1,500,XX/2
955 RETURN
965 PRINT"*****" ** CURSOR DOWN
975 FOR N=1 TO 5
985 PRINT"*****"
995 NEXT N
1005 VOL 7
1015 SOUND 1,510,XX/2
1025 RETURN
1035 PRINT"*****" ** CURSOR DOWN
1045 FOR N=1 TO 5
1055 PRINT"*****"
1065 NEXT N
1075 VOL 7
1085 SOUND 1,510,XX/2
1095 RETURN

```

QL Bookware

One more thing. None of the books make clear the following sequence: if drives empty and power off then switch on. Insert Pages or other cartridge as drive 1 (P1) if drives, move on drive 2 (P2) if display = TV then press F2 else press F1. The QL will then look for a program called 'Boot' for 'Boot', for that matter) on the cartridge as drive 1. If successful, it will LOAD and RUN it, this will start QUILL, ABACUS, BASEL, ARCHIVE or any other package. All done now, so on to the books.

Master QL User Guide by Laurel Horwood, £7.50 from Sigma Press, seemed no hope as I opened it. The contents are well sub-divided and offer different entry points for different levels of readership. I was also delighted to find 'Index, Ma, Ma, Ma' the manual you get with the QL is, apart of the identical title.

There are all the good things I can say about this book. It is related with caution, and few of these can be primary errors. The author includes some so-called keywords which don't exist in SuperBASIC, such as LOGO, INFO and CAT. He fails to state whether certain words should be used in SuperBASIC or ARCHIVE, and gives many examples in which proper words are used wrongly.

In several cases he recommended sequences of key-presses have the wrong or no effect. He is confused about the use of printers with BASIC, that is any several other authors! The starboard view is that this book was written with aid of a pre-production QL, it is certainly impossible to enter the 'PM' screen with 'change' or the 'RM' screen without. Some set out of order, a definite not to avoid.

Quick Computing with the Master QL by Barry Miles,

if you're new to the QL, you may like to introduce yourself to the machine with the help of the written word. This week Colin Wilton-Davies looks at introductory books



£6.95 from Hutchinson, is one of a series from this publisher. Most of the book is taken up with a description of the Pages software. This is quite easy to read, but is a descriptive rather than instructive. A few more examples and a few less clear and photographs would have placed our better SuperBASIC covered in a way which is adequate for reference by a user but not for learning by a newcomer. The method used is to give an alphabetical list of keywords with fairly short comments and short examples. Not much to say about this book — you'll see why in a minute! Now five out of ten gets, there's no winner.

There are probably two main reasons for buying a book which will introduce you to a computer. One is that you are seriously thinking about getting the machine, and would like more information than the advertisement or brochure has to offer; you may also hope for a non-proprietary view. The second is that you have just

unpacked your new machine and find that the manual is not only enormous, but has no index.

I have therefore chosen to review three books this week, which I think are reasonably good approaches to the QL. One of the great features of the QL is the bundled software which comes with it, and an introduction to this package should fail to cover the rest of Pages programs. For this reason, I have chosen a book which is a Guide to the Master QL, in another category.

Reading these three books, which may be intended for people who are newcomers to the QL, or not so completely new, I am dismayed to find common misconceptions about Microdrive. Some of these are serious enough to corrupt data and programs on the card edges, so I feel I must provide the answers by naming two Golden Rules for Microdrives on the basis of 'think about every byte'. I don't power on or off with a cartridge in any Microdrive

I don't reset when a Microdrive is rotating.

There are the laws of the Morden and the Forams, but it is not necessary to enter them further. If you neglect them, you will surely corrupt something, which may take many days to recover. On the other hand, I have never found, and have asking authors from receiving with a cartridge in a stationary drive or from continuously pulling out a cartridge from a drive which won't stop rotating in the latter instance, you may well get an incompletely saved file, but not corrupt file.

Introducing the Master QL, by Gerry Marshall, £5.95 from Hutchinson, is like the same error as the above book, and covers almost exactly the same ground! I find the very strange method. The review of the Pages software is more concise, and so less readable, but examples of use are even fewer. SuperBASIC has a very simple assumption for its keywords as Miles's book, but this is a bit than provided by a short introductory chapter. The then start the absolute beginner in the shallow end, with a phrase that the first command used is 'LIT', which is redundant in SuperBASIC. There is a number, so more a five and a half out of ten.

Why would anyone want to publish two books at once which are so nearly identical? Obviously nobody should buy both. The booky through the programming examples is the SuperBASIC section of the two books. I found many which were identical both in order and to those in the User Guide which came with my QL. Shock, horror, scandal! Did the series editor Mike Mapp decide to write the foreword so that Sinclair wouldn't sue for breach of copyright?

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Figure 4B. *Immunoblot of cytosolic fractions from 293T cells transfected with the indicated plasmids and treated with 100 ng/ml of phalloidin for 10 min. The blot shows the presence of F-actin in the cytosol fraction.*

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